
POPULAR
Computing
WEEKLY
September 1982 Vol 1 No 22
35p
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Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work

This Week



Cover illustration by Stuart Hughes

Editorial

In a week when they found George Washington's teeth and a boy who is allergic to Scunthorpe Commodore announced a £30 cut in the price of its Vic20 From September 28 the Vic20 will cost £169 99 including VAT

This move which had been rumoured ever since Sinclair launched the ZX Spectrum in April is an attempt to undercut some of the other low-cost micros on the market The Dragon 32, the TI 99/4A the Atari 400 and now the Lynx, are all priced around the £200 mark

With more micros likely to appear in the near future — they seem to be averaging almost one a week at the moment — the market is becoming increasingly price sensitive

Commodore has the advantage of an established user base and a wide range of software But price is still a crucial factor for prospective buyers

In the past two months, Sinclair has dropped the price of its ZX81 by £20, to £49 99 and Texas Instruments and Atari have cut more than £100 off the price of their micros Now Commodore has followed suit

If this competition among micro manufacturers continues, prices may yet drop further

Next Week



Life at the top is no joke in Kong's Revenge — a new game for ZX81

Vic20 price drops by £30

COMMODORE has announced two moves to boost sales of the Vic20 range of products and software

The price of the Vic20 is to be cut by £30 to £169 99 including VAT, from September 28 This drop takes the machine out of the competitive £200 region and places it between the two versions of the ZX Spectrum

Over 55 000 Vic20 machines have been sold in the eight months since its launch compared with over 40,000 Sinclair machines since Spectrum's April launch

In the second move, Commodore has set up a Vic20 owners club, Vic-Soft which will send the first issue of its new quarterly magazine to more than 25,000 Vic20 owners who completed and returned their guarantee cards

A Commodore spokesman explains Vic-Soft will be a place where owners will be first to find out about new things for their machines

Further issues and special offers will be available to those who join and pay the club's £5 membership fee

Prestel database for micros

PRESTEL is making a determined effort to capture the home computer market A 30 000 page database is being set up just for micro users

This scheme known as Micronet, will be launched in January The database will contain games programs and information about computers and user groups

As an added incentive Prestel plans to reduce its charges for evenings and weekends

Croydon venue for microfair

CROYDON Home Computer Fair will be held in the Greyhound Halls Park Lane Croydon on Saturday September 25

Over 40 exhibitors will be there entry will be £1 and 50p and the show will be open from 10 am to 8 pm More details from Ron Vogt Computer Fairs, 359 The Strand London WC2

Camputers Lynx has 48K Ram and high resolution colour graphics

Lynx unsheathes its claws

MORE details have emerged about the Camputers' Lynx (*Popular Computing Weekly*, September 9)

Based around the Z80A microprocessor, the Lynx has 48K Ram, expandable to 192K, and 16K Rom It has 24 lines × 40 characters display and a colour resolution of 248 × 256

The 48K Ram leaves 16K available to the user in the high resolution colour mode With additional memory expansion, the display can be boosted to 24 lines × 80 characters with a colour resolution of 248 × 512

An enhanced form of Basic, specially developed for the Lynx by Davis Jansons takes up 10K of Rom The remaining 6K is used for the keyboard monitor and screen driver

Other features of the Lynx include a typewriter keyboard, an internal speaker and an RS232 port To avoid any possibility of overheating the power supply will be external.

Though the Lynx is designed primarily for the home user it has CP/M file management compatibility

The hardware for the Lynx was designed by John Shirreff of G W Design Services, a Cambridge electronics firm Finance for the project was provided through the government's small firms loan guarantee scheme

The 48K Lynx, originally priced at £150 plus VAT will now be sold for £225 including VAT It will be launched officially in late October

Camputers Ltd has moved from its old address in Hills Road, Cambridge The firm is now based at 33A Bridge Street, Cambridge CA3 4AB

Programming award competition winners

POPULAR Computing Weekly's Programming Award Scheme Competition winners have been selected

First prize goes to Philip Bram of Crookesmoor Sheffield, for his program *Odyssey* He wins a Sinclair ZX Spectrum and a ZX printer

The winners were selected last week by Brendon Gore Editor of *Popular Computing Weekly*, and Jeremy Ruston, author and programmer

Jeremy Ruston commented "The competition received so many entries of a high standard that it was very difficult to decide on the winners

Odyssey was also the winning program in the Games category

Malcolm Davison won the Educational/Scientific section with the best presented program, *Spelling* for the 16K Spectrum

D Swindell won the Utilities section with his impressive *ZX81 Assembler*

Christopher Copper won the Business/Office section with *Business Accounts* for the 16K ZX81

BBC users in independence squabble

A ROW has broken out between the two main BBC micro user groups concerning their independence

In a letter to the magazine *Microcomputer Printout* Sheridan Williams — co-founder of Beebug — has accused rival group Laserbug of ties with a retail outlet He alleges "Laserbug are run by a shop called Computers For All and cannot represent their members in a truly independent way As far as I know the only truly independent user group is Beebug

Sheridan Williams

Paul Barbour new editor of Laserbug in a written reply to the letter says "Laserbug is and always has been independent of all outside bodies While Mr Williams claims he is completely independent, I would like to know how, in the mail-out by Acorn (which supplied the guarantee card to every owner of the BBC micro) he managed to get a sheet publicising his own group "

Beebug currently has a membership of 8 500 Laserbug now has over 2 000 members

Commodore 64 goes on sale

THE new Commodore 64 microcomputer will go on sale in the UK during the third week of September

It will cost £299 plus VAT At over a hundred and fifty pounds more than the Vic20, it nears the price of the 64 selling in the US at $599

A Commodore spokesman said There is an enormous perceived demand for the new machine in the UK The initial batch will be manufactured in Santa Clara, imported and sold through selected high street retailers

Letters

write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2

Is this misplaced enthusiasm?

There were a couple of inaccuracies in my program Screenprint which was published in *Popular Computing Weekly* July 29. The Rem statement in line 10030 should say that TS=4096 on Vics with more than 8K of memory and not 1024. Also in the accompanying text the calculation for NL should read

NL=INT((PEEK(36866) AND 127)/2)

I did send in an alternate listing but this was obviously misplaced

Ken Clark
22 Napier Avenue
Southend-on-Sea
Essex SS1 1LZ

Please help me Mister Postman

I wonder whether any of your readers can help me to obtain a copy of *PCW* April 29 (Planet Ruler issue). This will then enable me to complete my set of issues of your magazine

Ian Fensome
7 Brussels Way
Luton
Bedfordshire LU3 3TQ

Penitents' stool

I have spent hours trying to make your *Meltdown* program work (*Popular Computing Weekly* July 29). I now realise that at least lines 6500 and 7000 are omitted with possible errors in lines 7 and 70

Can you please advise of these and any other corrections for this program. I must say the very small print made other sections almost unreadable. A great pity as I believe that errors excepted, the magazine is very good value for money

M Farrant
49 Waterer Gardens
Tadworth
Surrey

You are correct, there are a couple of errors in the Meltdown program. The original program worked fine when we played it in our office. Unfortunately, our cassette recorder missed out a couple of lines when we printed out the program.

To correct the program, type in line 6500 RETURN and 7000 REM MELTDOWN.

You pays yer money and . . .

I am writing to reply to Mr S Stratford's letter in Peek & Poke (July 22). It will soon be possible to download telesoftware from teletext on the BBC microcomputer — production of the unit begins in October. If Beebusers can't wait, then programs appear on Ceefax along with a telesoftware newsletter (page 705)

Ian Beardsmore's reply to Mr Stratford said that a ZX Spectrum Prestel adaptor would not be possible " let alone feasible ". However, I was delighted to read in the following issue (July 29) that Sinclair are to build such an adaptor likely to cost from £50 — or less. Production starts on a similar adaptor for the BBC micro in early 1983

Before investing in Prestel it must be remembered that, unlike teletext it is not free. British Telecom charge on a time basis for using (a) the telephone line, and (b) the Prestel computer. Some information providers also charge you to look at their pages. Prestel is a brilliant British invention but it is too expensive for the home user at the moment, just like *Popular Computing Weekly*

Andrew Wiseman
Hartford Post Office
68 Mayfield Road Hartford
Huntingdon
Cambridgeshire PE18 7NJ

A partially populated b

I wish to comment on the letter To b or not to be, that is ' in July 29

The model A can be fully upgraded to model B standard for around £130 if done by an Acorn dealer, and around £75 if you fit them yourself

The only part of the tube that the model A does not have is the connector which can easily be soldered to the board — the model A board is just a partially populated model B board

Matthew Newman
3 Harvest Bank
Hyde Heath
Amersham
Buckinghamshire

Cubic rethink . . . WHOOPEE

In your competition page (July 15) you mention errors encountered on comparing cubes eg IF 3**3=27 THEN PRINT "WHOOPEE" will fail. However, PRINT 3**3 gives "27" so I thought of using STR$, eg IF VAL STR$ 3**3=27 THEN PRINT "WHOOPEE" will give a happy response every time.

S Haydock
61 Gordon Street
Wigan
Lancashire

Backslashing answer

Ian Beardsmore's reply to D Whittaker's query about Vic20 inverse graphics (July 22 issue) was somewhat less than helpful

The character in question was in fact an inverse (or reverse) video backslash. This is *not* found in the Vic20 character set but does appear in the character set of the larger CBM machines. When Vic20 programs are listed using a printer on one of the larger CBMs this character is printed in place of the inverse video £ which denotes *Ctrl red* on the Vic. An example of this appears in Appendix M (page 153) of the booklet *Personal Computing on the Vic20*. Your correspondent should have received a copy of this booklet with his machine

The reason for this, at first apparently strange effect, is that machines such as the CBM 3000/4000 do not have a £ sign in their character set. There are also slight differences in the versions of the ASCII code employed on the different machines. On the Vic20 the code for the inverse video £ is 220, on the CBM 3000/4000 this code corresponds to the inverse video backslash

There should be no confusion with the inverse video diagonal given by shifted M, since the backslash has a vertical ascender/descender at each end

During his discussion of this problem, Ian Beardsmore also reveals an alarming lack of appreciation of the operation of the reverse video controls on the Vic. If you have opened a print statement and then type *Ctrl rvs on*, an inverse video *r* will appear on the display but all subsequent characters will appear *as normal* until the program is run (or *RETURN* is pressed in the immediate mode). Then, and only then, will the characters appear in reverse video. Deleting the inverse video *r* will cancel the command, but the inverse video *r* will return once you start again"

On the other hand, in the immediate mode *without* a print statement typing *Ctrl rvs on* will not cause an inverse video *r* to appear and deleting will not cancel the command — all subsequent characters will appear on the screen in reverse video until *Ctrl rvs off* is entered

J Meardon
15 Brightwell
Reabrook
Shrewsbury
Salop SY3 7TQ

Manual error in Sinclair

Thank you for such a wonderful magazine

The reason why I have put pen to paper is to tell readers that I have spotted a mistake in the Sinclair manual. It only becomes dangerous when using machine code. It is the character on page 184 code 135. The character should be Shift Graphic 3 and not Shift Graphic E

Keith Dowell
53 Melville Road
Bootle
Merseyside

Jupiter Ace — the making of a micro

***David Kelly** returns to Foxhollow in pursuit of the Jupiter Ace.*

Now the Jupiter Ace has arrived (*Popular Computing Weekly*, September 9) the tongues of Altwasser and Vickers have been untied and they can talk about their new micro the machine that is not afraid to speak Forth

The two co-designers of the Spectrum left Sinclair five months ago to develop the machine

"I first thought in November last year that it would be a good idea to build a microcomputer" says Richard

"I knew that I couldn't do the whole thing on my own I can't write machine code — at least, I can't write it like Steve can

"I turned the idea over for some time but it wasn't until January that I mentioned anything to Steve

"I didn't know how Steve would feel about setting up on his own I had always thought Steve was a fairly cautious sort of chap and I wasn't sure if he would be interested

"As we talked it became clear that Steve was prepared to be adventurous — and it became clear to him that I was prepared to be adventurous — and there you are"

Both Richard and Steve wanted to do something different so they decided that their micro should run Forth rather than Basic

"We'd been talking before Christmas about Forth," explained Richard "We had both independently read an article that was printed in the magazine *Byte* — and we both got quite excited about it"

Having decided to build a new micro that would run Forth the two designers began to sort out the details of the new machine

"We spent the last weekend in January sitting down trying to work out the basics of the Ace We both know the Z80 processor inside out so we really had to use it, and at that stage I already had an architecture in mind

"The Ace had to be fairly inexpensive for two reasons You can always make a small computer bigger by hanging a selection of peripherals on it — which makes the small micro a better commercial proposition And we obviously know so much more about making small computers

"We agreed to spend a month evaluating the project We both joined FIG the Forth Interest Group Steve went off and bought lots of books and I started making enquiries of component manufacturers

By mid-March they were still not making much progress and they realised that if they were going to see the venture through, they would have to leave Sinclair There was only one time to do that — immediately after the Spectrum launch

"We couldn't possibly leave before, and, if we waited long after we would more than likely be headlong into another of Clive's projects," says Richard "So we left and went headlong into one of our projects instead

By this time the first draft of the hardware was already working

"If you look at all the new computers coming out they all have new hardware — ours was to have entirely new software as well Writing the Forth was a huge task for Steve

"While he was doing that I redrafted the hardware and designed the printed-circuit board Mixed in with this I was sorting all the components — looking around the factories for someone to build it We also approached the bank to try to get a three-month loan

"Forth is a very well documented language We decided on Forth 79 Standard, with some modification, and Steve built it all up from scratch

"To say Basic is becoming the standard language for micros is very misleading — you show me two machines that run the same version of Basic Forth is a better language It is about ten times faster than Basic It is more compact — we could easily do a 1K *Space Invaders* in Forth on the Ace

"Forth is easier to learn as the first language Changing from Basic to Forth is a bit like going on the continent and driving on the right You quickly get into the way of it but in the first 20 minutes you risk your life so many times

Steve Vickers (left) and Richard Altwasser co-designers of the Jupiter Ace

The Jupiter Ace will get its full launch at the *Personal Computer World* Show when the first production run machines will be on display

"We will build and ship 500 computers in September which will get us off the ground — production will ramp up from there according to demand

"In addition we are going to provide a memory expansion although with a little adaptation any Z80 peripheral can be connected because all the Z80 busses appear at the back of the Ace

"We will be writing our own software for the machine and we are working closely with several companies who have written good things for the ZX81 and have expressed a wish to write for us

"Most people buy a micro to learn about computers They spend a week getting into Basic and discover they cannot produce the kind of games they are used to without learning to program in machine-code That isn't easy so they resort to buying ready-made machine code games The manufacturer is selling a Basic machine to run machine-code What the Ace does is to provide machine-code speed in an easily understood language

"Learning to program should be easy If you buy a car it should be as easy to drive as possible Why should a computer be different? It is the job of designers to produce machines that my grandmother would find easy to use

"I think," says Richard "that the introduction of Forth is a major step in that direction We know we are right to produce the Ace — all we have to do is convince everyone else of that"



Swarm

A new game for 16K Spectrum by Simon Lane

An experimental research station at Porton Down is working on a hush-hush project. In a quest to invent a new weapon to match the Super Powers terrifying nuclear arsenals the research team is altering the genetic DNA patterns of various insects

Black widow spiders, their poisonous bite enhanced a thousand fold, are kept under close observation Killer ants bred for size and ferocity are encased in specially constructed titanium alloy cases Even beebes, their skins toughened to withstand almost any shock, are being used as instruments of destruction

The research team's most successful experiment has resulted in a species of hybrid bee These bees have wingspans of 12 ft with bodies to match They are carnivorous and need to feed almost constantly

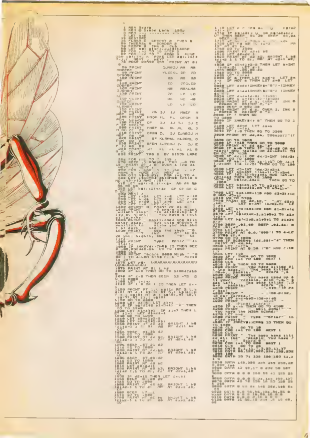
Unfortunately, a swarm of the bees escaped from one of the hives The bees are approaching a nearby city looking for food

You are part of an artillery unit called up to deal with the menace Your rocket launcher is one kilometre away from the swarm but you only have enough ammunition for one shot at each bee

When run the program displays rows of the giant bees on the screen Using the keys 5 6, 7 and 8 you must position your sights directly over each bee Enter 0 to fire

Full instructions are contained in the program

User defined graphics are present in lines 60-240 310, 320, 1087 and 1260



Reviews
software

Winged Avenger

Work Force 140 Wilsden Avenue, Luton Bedfordshire
Spectrum 16K or 48K
Price £6 95 inclusive

This is one of the first machine code games available for the Spectrum It is a colour and sound version of a game previously released for the ZX81

The cassette loaded with no problems from two different machines and is recorded three times on the tape It consists of a short *Basic* program followed by a large chunk of bytes so it is important not to switch off the machine the first time the screen no longer shows the loading pattern, as there is no warning on the display As the auto-load stops there is a brief description of the control keys and a choice of difficulty levels (0 to 6)

In order to discover how well this program emulates its big brother I set off one dark night into the nether regions of my local fair, armed only with my courage and a pocket full of 10p pieces The original game *Phoenix* sends squadrons of cosmic eggs at you that later hatch into almost indestructible vultures The vultures pursue you relentlessly, even when their wings have been blown off by your laser cannons

Smashing opportunity

After this Hitchcockian nightmare, there is the opportunity to smash the control craft which contains smart weapons that lock onto your base (I confess I could not get past this stage)

Work Force's version is one of the best Sinclair games so far It covers all the stages of the arcade original — the arrival of the mother ship is particularly good It is certainly a game to come back to again and again

My one criticism would be that the shield control protects you too well Kami-kazi birds that reach the bottom line hurl themselves to destruction with little damage to the home base

In all other respects, *Winged Avenger* seems to offer good entertainment, although £6 95 does seem a little high when compared with games like Bug-Byte's *Spectral Invaders* — which is almost £2 cheaper

Summary
A well written high-speed action game that uses the potential of the Spectrum fairly well Perhaps a little over-priced but in the long run cheaper than the arcade version — and you might even win! **JS**

QS Scramble

QS Scramble
Quicksilva, 92 Northam Road Southampton
ZX81 4K cassette
Price £5 50

At any ZX fair a certain amount of indifference toward humankind is called for when moving from stand to stand

The Quicksilva stand always attracts impenetrable crowds Their stand is justly popular — their software and hardware is always first class

Scramble their new release, follows the QS tradition of concentrating on the classic arcade games

The game has the same feel as QS's well-known Defender — your spaceship cruises above a changing mountainous landscape shooting at aliens swooping down from space and rockets being fired from the ground In addition you may drop bombs on the fuel dumps scattered among the mountains Points of course are scored for all of these operations With the aid of a little insert card you may change several of the parameters to give a personalised game You will want to make the game harder after playing a couple of times as the basic one soon becomes too easy

The package displays the usual high-quality artwork and the cassette itself is neatly printed with the title of the program The tape contains as is usual QS practice software for the QS character and sound generators

Summary
"Amazing" "fantastic" and other original observations from neighbouring arcade game fans were enough to convince me that Quicksilva have another worthy addition to their small but select range **TB**

Airline/Autochef

CCS 14 Langton Way, London SE3.
ZX81, 16K cassette
Price £4 75 each – £8 00 both

One of the most successful types of boardgame has been the business simulation witness *Acquire Monopoly* et al The ZX81 is admirably suited to this type of game — more so, in my opinion, than to the graphic arcade game, excepting the efforts of a very small, distinguished minority

Airline puts you in the managing director's seat Your task is to build the company into a viable business, with the help of bar charts, histograms and vicarious news flashes You must use this information on crewing levels freighting profits and so on, to make decisions As in real life, well laid plans are affected by outside events, in this case hi-jacks and crashes

The program is broadly realistic For instance until capital has been built up to a reasonable level airplanes cannot be bought but only leased Details such as this help to build a convincing insight into the business world

Autochef is not some new cooking device, but the name of a restaurant chain Again you are in charge and given information relevant to your business This time you decide what type of establishment to run what to charge for meals whether to give your staff pay rises and so on

Summary
Both programs feature attractive layouts and give the player a good sense of being in control of a big business Although not detailed enough for the serious student of Business Affairs the games are an ideal simulation for the interested teenager, and good plain fun for everybody **TB**

Reviews
hardware

Disc drive for ZX81

Macronics 26 Spiers Close Knowle Solihull West Midlands B93 9ES
Price £90 85 for the interface card
£182 85 for the floppy disc drive

This is the first disc drive to be demonstrated for use on the ZX81 It can store up to 48K of programs or data on it s single sided single density discs The loading speed of 24 seconds per 16K program is slow by normal disc standards but is 21 times faster than the tape speed

The user can either supply his own standard disc drive or buy a 5¼ inch disc drive from Macronics (mini-discs will be available soon)

The interface card (5 × 5½ inches) plugs into a motherboard, so that a 16K Ram pack *can* be used as well as the printer The motherboard simply plugs into the ZX81 and the drive is connected up via a 21-inch ribbon cable The drive must be powered up first, but there is no indication on the drive supplied that this has happened

The board contains a 2K Rom (soon to be expanded to 4K to cope with three drives and a *Copy* disc routine) which provides the 11 disc commands There is also 2K of Ram for use by the system as workspace

The commands can be written into any program by having the first line as LET E = USR9999 This stores all the numbers as variables so that LET E = USR DSAVE etc can be used The variable E will then return an error code which can be checked for operator or disc errors

Although E is used all the way through the documentation as a way of calling these machine code routines it is not listed as a reserved variable Variables used by the system are the commands (which take up 240 bytes of variable storage) *Dir Dsave, Dload Stat Write Read Create Kill Newd* and the transfer parameters *F$ R$(128)* and *R*

Dir provides a directory (which takes up the whole of the first track of the disc) of programs and data in the form of file names These file names consist of nine letters — six letters of the name of the file (no spaces) and three letters giving the file type separated by a full stop The user inputs odth when creating the fixed length data array which acts as a file on the disc

Each file must be in multiples of 1 28K as it can only be stored in whole tracks Each track is divided into 10 sectors of 128 bytes which can be *Written* to or *Read* from by using R$ to transfer the data from one sector in or out of memory

F$ carries the name of the file and R is used to tell the disc operating system which sector to use There are up to 390 sectors available on a 48K (40 track) disc All of this is done in *Fast* mode with the screen blank

Files cannot be overwritten and must be *Killed* to get rid of them Thus copying a file must be done by giving it a new name

Newd prepares a new disc for use by checking it and installing the directory track *Stat* will either give the number of free sectors on the disc or the length of the file named in F$ *Dload* and *Dsave* will load or save programs to disc and will allow programs to auto run as well

The documentation is good, but I would have liked to see a list of commands on one page as quick reference guide Also using a one dimensioned string array ie *Dim*R$(1 128) instead of *Dim*R$(128) would mean that the string could be *Input* and thus save on memory

It is a pity that larger Ram packs cannot be used as a full 48K of Basic memory would make better use of the disc At the moment all 48K Ram packs also overlay the 8K—16K space with Ram which stops the operation of the disc s Rom

Macronics disc drive for the ZX81 can store up to 48K on single sided single density discs It has a loading speed of 24 seconds per 16K program

Conclusion
This system will only work on the ZX80 and ZX81 It's greatest challenger will be Sinclair s microdrive When you compare the cost, it is cheaper to buy a 48K Spectrum and a Microdrive But ZX81 users may not want to rewrite software **SA**

Thermal printer

Computer Keyboards Glendale Park Fernbank Road Ascot Berkshire
Price £110 97 inc VAT and postage

This is a thermal printer for the ZX81 and ZX80 with 8K Rom It provides three commands similar to *Lprint List* and *copy* via *Usr* routines located in a 2K Rom contained in the CAI O black box

There is a port located in the 14K 16K area of the box s memory map and the three Eprom sockets are mapped into the 8K 14K space There are also a number of empty sockets on the board which allow you to upgrade to a RS232 two way modem interface

The CAI printer is considerably larger than the Sinclair printer (10½ × 7½ × 4 ins) and comes in a white box with three controls plus a flip up cover for the paper roll The controls are *Power* on *Paper advance* and a lever to lift up the printing heads for inserting paper The paper roll is twice the length of the Sinclair paper and half the price (£1 30 a roll)

All the commands for the printer are in the form of *Let i=Usr(xxx)* and the only variable used in *p$* which contains the string to be *Lprinted* The printer will stop with a error code if it is not in *Fast* mode (which has to be set by the user) if p$ has not been set or the printer is faulty

Conclusion
This alternative to the Sinclair printer is four times cheaper on paper and is cheaper than spending £200-£300 on a paper printer It is expensive but don t forget you also get a 16 line port and the option to add an RS232 interface as well The cost of the extra components I understand will be about £40 The *fast* mode must be specified by the user which is annoying **SA**

Open Forum

Open Forum is for you to publish your programs and ideas
It is important that your programs are bug free before you send them in We cannot test all of them
Contributions should be sent to Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2H 7HF

How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week

The author of that program will qualify for DOUBLE the usual fee we pay for published programs. (The usual fee is £10.)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette

The program will be well documented, the documentation being typed with a double spacing between each line

The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features

Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper, avoiding any creasing

Please enclose a stamped, self-addressed envelope.

Super Expander

on Vic 20

I am sure there are a large number of Vic20 owners who have the Super Expander cartridge I have not yet seen your magazine publish any programs which make use of it

Here are four short programs each of which should be run with the cartridge plugged in

String & nails

This program shows how curves can be created by using straight lines The program repeats in seven different colours and then restarts The listing is straightforward

Line 5 Begins the loop to change the colours clears the screen (scnclr) and sets the colour
Lines 10-40 Draw the base pattern.
Lines 50-80 Draw the inner pattern with a short delay at the end of line 80

Circle cones

This program draws two cones over each other to show how multiple circles can draw straight lines The program repeats in seven different colours

Line 15 Is the loop for the seven colours and sets the colour
Lines 20-40 Draw the first cone
Lines 50-70 Draw the second cone
Line 70 Also clears the screen for the next colour

Tunnel vision

This program gives the effect of looking down a tunnel with an object coming towards you and then going away The program repeats in seven different colours

Line 10 Is the loop for the seven colours and changes graphic modes for effect
Lines 30-35 Is the object going away from you
Lines 40 50 Is the object coming towards you

Wine glass

This program draws a wine glass and then 'paints' the background and fills the glass with colour Note that graphics mode 1 must be used to use the colours here

Line10 Sets a white border white background blue characters and light yellow for the auxiliary colour
Lines 20-30 Draw the top of the glass
Lines 40-50 Draw the stem of the glass
Lines 60-70 Draw the base of the glass
Line 80 Fills the glass Then paints the back grouhe in the auxiliary colour The colour is then changed to yellow border and green characters
Line 90 There are 20 half density blocks here The *Char* command is the same as the *Print at* statement as on the ZX81

```
2 REM STRING AND NAILS USING THE SUPER EXPANDER CARTRIDGE BY A.HORRELL
5 GRAPHIC2 FORA=1TO7 SCNCLR COLOR0,0,A,0
10 FORY=0TO1023STEP40 DRAW2,0,YTO1023-Y 0 NEXT
20 FORY=0TO1023STEP40 DRAW2 Y 1023TO0 Y NEXT
30 FORY=0TO1023STEP40 DRAW2 Y,1023TO1023 1023-Y NEXT
40 FORY=0TO1023STEP40 DRAW2 1023 1023-YTO1023-Y 0 NEXT FORU=1TO500 NEXT
50 FORY=0TO512STEP40 DRAW2,512,YTO512+Y,512 NEXT
60 FORY=0TO512STEP40 DRAW2,Y,512TO512,512-Y NEXT
70 FORY=0TO512STEP40 DRAW2 Y,512TO512,Y+512 NEXT
80 FORY=0TO512STEP40 DRAW2 512,1023-YTO512+Y 512 NEXT FORU=1TO999 NEXT NEXT RUN

READY.
```

```
5 REM CIRCLE CONES USING SUPER EXPANDER CARTRIDGE BY A.HORRELL
10 GRAPHIC2
15 FORC=1TO7 COLOR0,0,C 0
20 A=320 FORU=200TO812STEP20
30 CIRCLE2 U,512,A0,7,A
40 A=A-12 NEXT
50 A=320 FORU=200TO812STEP20
60 CIRCLE2,1023-U 512 A0,7 A
70 A=A-12 NEXT FORP=1TO1000 NEXT SCNCLR NEXT

READY.
```

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```
5 REM TUNEL VISION USING THE SUPER EXPANDER CARTRIDGE BY A.HORRELL
10 FORC=1TO7 COLOR0-0,C @ GRAPHIC2 GOSUB30 GRAPHIC1 GOSUB30 NEXT RUN
30 FORX=0TO512STEP15 DRAW2,X,XTO1023-X,XTO1023-X,1023-XTOX,1023-XTOX,X NEXT
35 FORM=1TO050 NEXT
40 FORY=513TO1023STEP15 DRAW0,Y,XTO1023-Y,XTO1023-X,1023-XTOY 1023-YTOY,X NEXT
90 RETURN

READY.

5 REM WINE GLASS USING THE SUPER EXPANDER CARTRIDGE BY A.HORRELL
10 GRAPHIC1 COLOR1 1 6 15
20 CIRCLE2 512,184,210.64
30 CIRCLE2 512,184,210 292 0,50
40 DRAW2 472,460TO472,768
50 DRAW2 552 460TO552,768
60 CIRCLE2 512,768 175 55 00,71
70 CIRCLE2 512,325 210 50.5 60
80 PRINT1 512 385 PRINT3 0 0 COLOR1,7.5,15
90 FORT=1GTO19 CHAR",0, [illegible]' NEXT
100 END

READY.
```

Super Expander
by Andy Horrell

Meteor run

on Unexpanded Vic-20

The idea of the game is to steer your spaceship through an on-coming meteor storm You have the option of moving left and right to avoid the meteors but even so, you have to be very quick to remain alive for any considerable length of time

With play, the game becomes addictive, as you are always trying to better your previous score

Program notes.

Lines

- 10-70 Check to see if user requires instructions
- 80-150 Set up special character generator
- 160-160 Activate new character set and commence game
- 180-210 Full position of spaceship and stars
- 220-240 Check for movement and crash
- 250 260 Increase score
- 270-310 Perform left and right movement
- 320-410 High score and end of program routine
- 420-520 Sound and colour for crash
- 530-610 Instructions

```
10 PRINT"3 *** METEOR RUN *** "
20 PRINT"  BY NIGEL AYLING
30 PRINT"  INSTRUCTIONS (Y N)?"
40 GET X$ IF X$<>"Y" AND X$<>"N" THEN 40
50 IF X$="N" THEN 80
60 GOSUB 530
70 GOTO 80
80 PRINT"      PLEASE WAIT"
90 POKE 52-28 POKE 56 28 CLR
100 FOR I=7168 TO 7679 POKE I PEEK(I+25000) NEXT
110 FOR I=7160 TO 7175 READ Z POKE I Z NEXT
120 FOR I=7432 TO 7439 READ Z POKE I Z NEXT
130 DATA 102 60 126,255 126,60 24,24 24 60,254-254-255,255 119 102
140 POKE 650,128
150 PRINT" PRESS A KEY TO START"
160 GET X$ IF X$="" THEN 160
170 PO=7691 S=1 PRINT "[illegible]" POKE 36875 0
180 POKE 36863 255
190 POKE PO 0
200 R=INT(RND(1)*22)
210 PRINT TAB(R)"!"
220 IF PEEK(PO)=33 THEN GOSUB 420 GOTO 320
230 GET A$ IF A$="" THEN 250
240 GOSUB 270
250 S=S+1
260 GOTO 190
270 IF A$="A" AND PO=7680 THEN 190
280 IF A$="A" THEN POKE PO,32 PO=PO-1 POKE PO 0
290 IF A$="L" AND PO=7701 THEN 190
300 IF A$="L" THEN POKE PO,32 PO=PO+1 POKE PO 0
310 RETURN
320 FOR X=1 TO 1000 NEXT POKE 36869,240 POKE 36879 2" PRINT"J"
330 PRINT"   YOU CRASHED "
340 IF S>H THEN H=S GOTO 360
350 PRINT"YOU SCORED S PRINT GOTO 370
360 INPUT YOUR NAME PLEASE " N$
370 PRINT HIGH SCORE IS HELD BY " N$ " AT" H
380 PRINT"   WANT ANOTHER GO ?"
390 GET X$ IF X$<>"Y" AND X$<>"N" THEN 390
400 IF X$<>"Y" THEN 620
410 GOTO 150
420 POKE 36878,15
430 FOR I=15 TO 0 STEP-1
440 J=J+1 IF INT(J/2)=(J/2) THEN T=41 GOTO 460
450 T=26
460 POKE 36877 300
470 POKE 36879 T
480 FOR X=1 TO 100 NEXT X
490 POKE 36878,1
500 NEXT I
510 POKE 36877-0 POKE 36878 0
520 RETURN
530 PRINT"3    INSTRUCTIONS "
540 PRINT "THE OBJECT OF THE GAME"
550 PRINT"IS TO GUIDE YOUR WAY"
560 PRINT"THROUGH A METEOR STORM"
570 PRINT" SCORE IS GIVEN DEPEND
580 PRINT" ING ON HOW LONG YOU  LAST "
590 PRINT"      CONTROLS"
600 PRINT"  A-LEFT   L-RIGHT"
610 RETURN
620 PRINT"J" END
```

Meteor Run
by Nigel Ayling

Tennis

on ZX81

There is a distinct lack of two player games for the ZX81 and even less that have moving graphics involved This is probably due to the relative slowness of the ZX81

This 4K program is written almost entirely in MACHINE CODE and is for one or two players The game is almost identical to the tennis games found on many video games The screen shows the two bats the tennis court and of course, the ball The one-player version of the game is squash practice

To play the game is very simple Any key from 1 to 5 will move the left bat up, and any from z to v will move it down Any key from 6 to 0 will move the right bat up and any from b to will move it down

The ball will bounce off the top and bottom walls as well as the bats A point is scored when the ball goes out as in tennis The winner is the first to get to 15 points

As the program is nearly all in machine code I will not attempt to explain the workings of it The small basic section of the program handles the scoring and *Pokes* the random height from which the ball will appear When the game is finished the computer will print 'GAME OVER and stop

There will be no report code as this would obscure the scores which are shown on line 24 Pressing a key will give the normal response The *Break* key only operates when the ball is off the screen

The two tables below show how to vary the game as you like To load the program type in a line 1 REM of 336 x s and the machine code loading program given and enter the code Then edit out lines 200 onwards and add the small section of the Basic program Type *Run* to start it

Changes that can be made

POKE

16833 (1 100) for overall speed — initially 10
16749 (2 15) for left bat position — initially 7
16701 (17 31) for right bat position — initially 29
15764 (1 5) for left bat size — initially 3
16816 (1 5) for right bat size — initially 3

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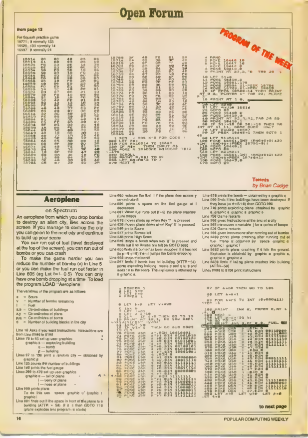


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For Squash practice game
16771 : 9 normally 133
16529 : 133 normally 14
16537 : 9 normally 24

PROGRAM OF THE WEEK

Tennis
by Brian Cadge

Aeroplane

on Spectrum

An aeroplane from which you drop bombs to destroy an alien city, flies across the screen. If you manage to destroy the city you can go on to the next city and continue to build up your score.

You can run out of fuel (level displayed at the top of the screen), you can run out of bombs or you can crash.

To make the game harder you can reduce the number of bombs (v) in Line 5 or you can make the fuel run out faster in Line 605 (eg Let f=f−0.5). You can only have one bomb dropping at a time. To load the program LOAD "Aeroplane".

The variables of the program are as follows:

- s = Score
- v = Number of bombs remaining
- f = Fuel
- a,b = Co-ordinates of buildings
- x,y = Co-ordinates of plane
- p,q = Co-ordinates of bomb
- d = Number of building blocks in the city

Line 10 Asks if you want instructions. Instructions are from Line 8990 to 9180
Lines 70 to 95 set up user graphics
graphic s — exploding building
q — bomb
p — building
Lines 97 to 130 print a random city — obtained by graphic p
Line 125 counts the number of buildings
Line 140 prints the fuel gauge
Lines 300 to 470 set up user graphics
graphic o — tail of plane
l — belly of plane
i — nose of plane
Line 600 prints plane
To do this use space graphic o graphic l graphic i
Line 601 finds out if the space in front of the plane is a building (ATTR = 58). If it is then GOTO 710 (plane explodes and program restarts)
Line 605 reduces the fuel 1 if the plane flies across y co-ordinate 5
Line 606 prints a space on the fuel gauge as f decreases
Line 607 When fuel runs out (f=0) the plane crashes (Line 8990)
Line 610 moves plane up when Key '7' is pressed
Line 620 moves plane down when Key '6' is pressed
Line 646 prints Score
Line 647 prints Bombs left
Line 648 prints High Score
Line 650 drops a bomb when key '0' is pressed and finds out if no bombs are left (ie GOTO 900)
Line 655 finds if a bomb has been dropped. If it has not (ie p=0 q=0) then it jumps the bomb dropping
Line 660 drops the bomb
Line 667 finds if bomb has hit building (ATTR=58), prints exploding building, resets p and q to 0 and adds 10 to the score. The explosion is obtained by a graphic s.
Line 670 prints the bomb — obtained by a graphic q
Line 690 finds if the buildings have been destroyed. If they have (ie d=S/10) then GOTO 800
Line 710 prints exploding plane, obtained by graphic s graphic s graphic s graphic s
Line 730 Game restarts
Line 800 gives instructions at the end of a city
Line 805 introduces a variable j for a series of beeps
Line 820 Game restarts
Line 900 gives instructions after running out of bombs
Line 8990 prints plane crashing after running out of fuel. Plane is obtained by space graphic o graphic l graphic i
Line 8992 prints plane crashing if it hits the ground. Explosion is obtained by graphic s graphic s, graphic s graphic s
Line 8838 finds if falling plane crashes into building (ATTR=58)
Lines 8990 to 9180 print instructions

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```
[illegible]
```

Aeroplane
by Paul Haigh

Bomb Alley

on Spectrum

The objective of the game is to demolish a city of skyscrapers using an aircraft equipped with bombs and short-range missiles

The aircraft with its 100 bombs and 200 missiles flies from *Print Position* 0,0 to *Print Position* 21 31

A bomb will demolish the top four storeys of a building directly below and a missile the top storey of a building at the same height Flying the aircraft into a building will end the game The first two skyscrapers must be destroyed by bombs to complete the game Flying next to them will explode the aircraft

Points are scored as the plane moves towards 21 31 and for each storey demolished by a bomb At the end of each game a score is given with the highest score attained so far

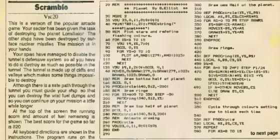
Program notes

Line 1000 User defined graphics fir aircraft.
Line 1500 Instructions
Line 2000 Flight of aircraft and weapon controls.
Line 3000 Fire missile
Line 4000 Drop bomb
Line 8000 End of game and scores
Line 9000 Draw random city of 32 skyscrapers.

DELETE Lines 2070 and 2080 to increase aircraft speed
Change LINES 9030 and 9030 to alter scoring method
INKEY$ 0 to fire missile
INKEY$ 1 to drop bomb
All Q s are graphic

```
[illegible]
```

Bomb Alley
by Ken Rylett



Scramble
by Neil Eckersley

Scramble

Vic20

This is a version of the popular arcade game Scramble. Your sector has been given the task of destroying the planet Lorsllaior. The other ships have been destroyed by surface nuclear missiles. The mission is in your hands.

Your spies have managed to disable the tunnel's defensive system so all you have to do is destroy as much as possible in the tunnel. The tunnel is made up of cliffs and valleys which makes some things impossible to destroy.

Although there is a safe path through the tunnel you must guide your ship so that you can destroy the vital fuel dumps and so you can continue on your mission a little while longer.

At the top of the screen the running score and amount of fuel remaining is shown. The best score for the game so far is 820.

All keyboard directions are shown in the instructions. The program runs on the unexpanded Vic, but can be used without any modification with any amount of memory.

Program notes

Lines

6-10	Set-up of variables according to amount of memory
1998-2006	Move screen by one space to the left
2007 2014	End of program
2101 3146	Create the landscape
3150 3210	Check which key is pressed
9002-9092	Explosion when hit occurs, and adjust score
9500 9791	Check if ship crashes
10001 10004	End of program
11000 12110	Explosion of ship
15000 15019	Instructions

```
10 REM  ****************************
        **  Planet  By G.Elliot  **
        ****************************
20 MODE 2
35 VDU 23,0,11,0;0;0;0;
40 PRINTTAB(1,2);:PROCstring("
   ****Planet****")
50 REM  Plot stars and redefine
   flashing colours.
60 FOR X%=8 TO 15
70   VDU 19,X%,7;0;
80   GCOL 0,X%
90   FOR Y%=0 TO 10
100    PLOT 69,RND(1279),RND(1023)
110    NEXT
120  NEXT
130 VDU 19,1,2;0;:GCOL 0,1
140 MOVE0,0:DRAW1279,0:DRAW1279,1023:
   DRAW0,1023:DRAW0,0
150 REM  Draw bottom half of planet
160 GCOL 0,1
170 PROCcircle(640,512,-200)
180 REM  Draw rings
190 FOR X%=600 TO 350 STEP -50
200   PROCring(640,512,X%)
210   NEXT
220 REM  Draw top half of planet
230 GCOL 0,1
240 PROCcircle(640,512,200)
250 REM  Animate drawing
260 PROCcycle
270 VDU23,0,11,0;0;0;0;
280 END
290
300   Draw one Half of the planet.
310
320 DEF PROCcircle(X%,Y%,R%)
330 LOCAL A%,B%,C%:C%=R%*R%
340 FOR A%=0 TO R% STEP SGNR%
350   B%=SQR(C%-A%*A%)
360   MOVEX%-B%,Y%+A%
370   DRAWX%+B%,Y%+A%
380   NEXT
390 ENDPROC
400
410   Draw rings.
420
430 DEF PROCring(X%,Y%,R%)
440 LOCAL A,B%,C%,D%
450 D%=8
460 FOR A=0 TO 2*PI STEP PI/24
470   B%=SIN(A)*R%+X%:C%=(B%-X%)
      DIV6+COS(A)*R% DIV3 +Y%
480   GCOL 0,D%:D%=D%+1:
      IFD%>15THEND%=8
490   IF A=0THEN MOVEB%,C%
      ELSE DRAW B%,C%
500   NEXT
510 ENDPROC
520
530   Cycle through colours setting
      one to black each time
540
550 DEF PROCcycle
560 LOCAL A%,B%,C%,T%
570 REPEAT
580   FOR A%=8 TO 15
```

to next page

Planet

on BBC Micro

This program produces an animated picture of Saturn by revolving the rings. The program starts by drawing stars followed by Saturn itself, then after the drawing is finished the program animates the rings.

The program works by redefining the flashing colours in mode 2. The program starts by drawing random stars (Lines 50 to 120) and setting the flashing colours to white.

Then the lower half of Saturn is drawn (Line 170) using *Proccircle*. The rings are then drawn using *Procring* which draws a 48 sided ellipse containing all the flashing colours in sequence.

The top half of Saturn is drawn which also erases the rings behind Saturn. The animation is then produced by *Proccycle* which cycles through all the flashing colours setting one to black and the rest to white.

Since the rings are drawn using these colours in sequence, black bands will be seen to circle the planet.

from previous page

```
590     FOR B%=2 TO 15
600 IF B%=A% THEN VDU19,8%,0;0; ELSE
IF B%>7 THEN VDU 19,8%,7;0; ELSE
VDU 19,B%,(8%+C%)MOD6+2;0;0;
 610        NEXT
 620      T%=TIME:REPEAT UNTIL
    TIME>T%+25
 630      C%=C%+1
 640      NEXT
 650   UNTIL INKEY(0)<>-1
 660 ENDPROC
 670
 680   Print string in set of
    colours
 690
 700 DEF PROCstring(A%)
 710 LOCAL A%
 720 FOR A%=1 TO LEN(A%)
 730   COLOUR A% MOD 6 +2
 740   PRINTMID$(A$,A%,1);
 750   NEXT
 760 ENDPROC
 770
 780  Print Screen onto the printer
 790
 800 DEF PROCscreen
 810 CALL dump
 820 ENDPROC
 830
 840  Assemble routines
```

Planet
by David Elliot

Morse

on Spectrum

Morse is intended for practice Phrases may be continuously repeated, giving the operator a chance to learn combinations of words or characters

The morse symbols are printed alongside each letter and the whole message is repeated.

Line 70 can be readily changed to suit the working speed 0 5 being as slow as a beginner would require

Line 320 ensures no stopping when the screen fills — ie it is an auto-scroll Line 140 ensures that only capital Ascii codes are used.

```
 10 REM  morse
 20 REM © ARTLAW
 30 REM to change rate adjust v
alue # line 70
 40 LET U$=            REM graphic
1+ space
 50 LET D$= "  "   REM graphic 3
twice + space
 60 DIM a(43,8)
 70 LET d=0.1   REM Dot Value
 80 LET s=4*d   REM Dash Value
 90 FOR j=1 TO 43
100 FOR k=1 TO 8
110 READ a(j,k)
120 NEXT k
130 NEXT j
140 POKE 23658,8
150 LET f=30  REM Frequency
160 CLS   PRINT   PRINT  [illegible]
170 PRINT  ONLY CAPITALS & nume
rals   PRINT  [illegible]
180 INPUT  enter message ,a$  C
200 LET l=LEN a$
200 FOR j=1 TO l
210 LET b$=a$(j)  LET b=CODE b$
220 IF b=32 THEN GO TO 410
230 LET b=b-47
240 FOR k=1 TO 8
250 LET c=a(b,k)
260 IF c=-1 THEN GO TO 310
270 BEEP c,f
280 IF c=d THEN PRINT d$;
290 IF c=s THEN PRINT u$
300 NEXT k
310 PRINT " ",b$
320 POKE 23692 255
330 NEXT j
340 PRINT a$ ,,, ,,
350 PRINT
360 PRINT  Another message , L
or any key  N to stop   ,"C to R
EPEAT MESSAGE"
370 IF INKEY$=" THEN GO TO 370
380 IF INKEY$="n" OR INKEY$="N"
THEN CLS   POKE 23658,0  STOP
390 IF INKEY$="C" THEN CLS   GO
TO 190
400 GO TO 350
410 PAUSE 20  GO TO 330
420 REM Data section #must rem
ain in this order#
430 DATA [illegible] REM 0 to 4
440 DATA [illegible] REM 5 to 9
450 DATA [illegible]
460 DATA [illegible] REM A to E
470 DATA [illegible] REM F to J
480 DATA [illegible] REM K to O
490 DATA [illegible] REM P to T
500 DATA [illegible] REM U \
510 REM end of data section
```

Morse
by Len Winsor

Spectrum

In this new slot various contributors explore different aspects of the ZX Spectrum

Function line displayed in 3-D graphics

***Ian Reynolds** gives a three dimensional view of plotting.*

This program runs on a 16K or 48K Spectrum. It produces a three dimensional view of the function held at line 1010. You can input any function at line 1010 to produce stunning effects on the screen.

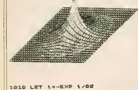
There is a simple, but very effective, "hidden line removal" routine comprised of lines 5, 10, 1022, 1023, 1026, 1050 and 1060.

When run, the program will request "resolution" which determines the spacing between the points plotted. A value of four gives a detailed plot, 10 gives a reasonable plot and 20 produces a fast but crude display. A resolution of four takes between 15 and 25 minutes depending on the function at line 1010.

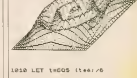
Experimenting with different functions and resolutions will give you some idea of the Spectrum's graphics capabilities. The following examples produce interesting displays.

Resolution	Line 1010
4	LET t = EXP t/60
10	LET t = (SIN(t+3)+COSt)/4
5	LET t = LN ABS COSt/10
10	LET t = SGN COS (4+t)/10
5	LET t = − SINt+(1−COSt)/2

```
   1 BORDER 0: PAPER 0: CLS
   3 INPUT "resolution";s
   5 DIM p(250,2)
  10 FOR f=1 TO 250: LET p(f,2)=
255: IF f>140 THEN LET p(f,2)=f
  12 NEXT f: BEEP .5,30
  15 FOR f=-50 TO 50 STEP s
  20 LET a=f
  25 LET b=50-ABS f
  30 FOR g=-70 TO 70
  35 LET c=70-ABS g
  40 GO SUB 1000
  50 NEXT g
  55 IF f=50 THEN STOP
  60 FOR a=f+1 TO f+s-1
  65 LET b=50-ABS a
  70 FOR g=-70 TO 70 STEP s
  75 LET c=70-ABS g
  80 GO SUB 1000
  90 NEXT g
 100 NEXT a
 110 NEXT f
1000 LET t=b*c/600
1005 LET r=a+g+121
1010 LET t=-EXP t/80
1020 LET t=INT (80+a-t*60)
1022 IF f=-50 THEN LET p(r,2)=t
1023 IF t<=p(r,1) THEN GO TO 105 0
1025 INK 6
1026 LET p(r,1)=t
1027 IF t<0 THEN LET t=0
1028 IF t>175 THEN LET t=175
1035 PLOT r,t
1040 RETURN
1050 IF t>=p(r,2) THEN RETURN
1060 LET p(r,2)=t
1070 INK 5
1080 GO TO 1027
```



1010 LET t=-EXP t/80



1010 LET t=COS (t*4)/6

Sound & vision



Sounding in the generation gap

This program which runs on an unexpanded Vic20 produces sound using all four sound generators.

On running the screen displays the letters A to D (left) and W to Z (right). After each letter, you must input a series of numbers eg A 128 255 1. The first and second sets of numbers can have any value between 0 and 255 providing the second number is larger than the first. The third number is the *Step* between the first two numbers.

After entering the program press '2'. This will produce a demonstration of a sound routine contained in lines 3999–4150.

Having listened to the demonstration sound, press any key. This will produce the response "Sound 0 or 1 or 2". Pressing 0 or 1 will allow you to hear the sounds produced by the inputted numbers. To change the sound simply enter Y and input the numbers of your choice.

John Ingham

You can share your own favourite Sound or Vision programs with other readers by sending lists with explanations to us at *Popular Computing Weekly*.

WRITE TO: Sound & Vision, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

```
[illegible]
... NEXT GOSUB281
... POKE36878,15
... PEEK(36874)ANDB%
... PEEK(36875)ANDB%
... PEEK(36876)ANDB%
... PEEK(36877)ANDB2
... PEEK(36874)ANDWORN
... PEEK(36875)ANDBURN
... PEEK(36876)ANDCOPY
... PEEK(36877)ANDBORZ
... GETI$:IF ... THENGOSUB281
... IFPEEK(197) ... THEN141
... IF ... THEN ...
... IFPEEK( ... )THEN141
146 POKE36 ... 
15 GETB$:IFB$= ... THEN151
... PRINT ... THENPRINTB$ ...
... IFB$=MID$( ... THENPRINTB$ ...
... GOTO141
... GOSUB221 PRINT"ENTER START":INPUTA
... PRINT"ENTER FINISH":INPUTB
... PRINT"ENTER STEP":INPUTC
... GOSUB221 GOTO141
... GOSUB221 PRINT"ENTER START":INPUTD
201 PRINT"ENTER FINISH":INPUTE
206 PRINT"ENTER STEP":INPUTF
211 GOSUB221 GOTO141
216 REM DISPLAY
221 PRINT ...
226 A$=STR$(A):A$=RIGHT$(A$,LEN(A$)-1):A$=LEFT$(D$,3-LEN(A$))+A$
231 ... MID$( ... 
... A1$=STR$(B):A1$=RIGHT$(A1$,LEN(A1$)-1):A1$=LEFT$(D$,3-LEN(A1$))+A1$:A$=A$+A1$
241 A1$=STR$(C):A1$=RIGHT$(A1$,LEN(A1$)-1):A1$=LEFT$(D$,3-LEN(A1$))+A1$
246 A$=A$+ ... A1$
251 A1$=STR$(D):A1$=RIGHT$(A1$,LEN(A1$)-1):A1$=LEFT$(D$,3-LEN(A1$))+A1$
... A$=A$+ ... MID$( ... 
... A1$=STR$(E):A1$=RIGHT$(A1$,LEN(A1$)-1):A1$=LEFT$(D$,3-LEN(A1$))+A1$:A$=A$+A1$
... A1$=STR$(F):A1$=RIGHT$(A1$,LEN(A1$)-1):A1$=LEFT$(D$,3-LEN(A1$))+A1$:A$=A$+A1$
... REM ...
... RETURN
... GOSUB221 ...
... PRINT"SOUND 0 OR 1 OR 2"
281 GETB$:IFB$=""THEN281
... IFB$ ... THEN ...
... IFB$= ... THENGOSUB3999 ... GOTO281
... RETURN
... PRINT" ... 
... POKE ... PEEK( ... )AND128OR ...
[illegible]
```

Dots and dashes fall for beeps

***Paul Newman** presents a morse code trainer for the Spectrum.*

This short program will allow the Spectrum to *Beep* morse characters as they are typed on the keyboard. The character speed as given is quite slow and may be altered to suit by a simple change to line 35. In-code comments should explain most lines, except for line 10 where the morse characters are coded into a *Data* statement.

The morse dots and dashes are represented as binary 0 and 1 respectively. Thus the character "L" which is dot dash dot dot, in morse code may be represented as the binary notation 0100. In order that successive division by two (effectively binary division) may "strip" each binary digit off in the correct order the notation is reversed — viz 0010. Finally, the binary notation is given a "guard bit" to form the complete binary representation of "L" — 10010 — which is binary for 18.

The data statement in line 10 contains the representation for 0—9 and A—Z. Note that they are given in the order groupings recommended by the Radio Society of Great Britain (E I S H / T M O etc) which are specially designed to assist in the learning of morse code. I have done it this way to help the user to design his own morse code tutor.

When learning morse code, it is fruitless learning the 'dots & dashes'. The only way of becoming proficient at morse is to learn how each letter sounds.

When altering line 35, remember to preserve the 1:3 dot:dash ratio. If you are seriously learning morse, alter line 35 to BEEP .13+.26*(x=1),0 to give you a reasonably slow character speed. Factors of .07 and .14 will produce a character speed of about 12 words per minute, which is the Radio Amateurs examination speed requirement. Text should be typed in lower case.

Most of the remaining details of the program are indicated in the Rem statements.

The Spectrum can be connected to a radio transmitter using a simple one-chip interface and I/O port.



Paul Newman, founder of the Sinclair Amateur Radio User Group

Paul Newman is the founder of SARUG UK, the Sinclair Amateur Radio Users Group. He has long been an amateur radio enthusiast. During 1980 he became interested in using microcomputers to control radio equipment. Early in 1981 he became the first British member of ASARUG, the American Sinclair radio enthusiasts group. In November 1981 he formed the present UK group, SARUG UK. Members of the group keep in touch over the air and through the pages of the SARUG newsletter which he edits. The group now has 175 members. Membership is £5 and is open to all amateur radio licence holders or anyone with a proven interest in amateur radio. For further information contact Paul Newman (G4 INP), 3 Red House Lane, Leiston, Suffolk.

```
  1 REM  morse keyboard program
 for SPECTRUM 16K P NEWMAN
  10 DATA 6,17,21,9,2,20,11,16,4
,30,13,18,7,5,15,22,27,10,8,3,12
,24,14,25,29,19,63,62,60,56,48,3
2,33,35,39,47,63  REM morse char
acter data
  11 DIM z(36)  REM storage for
cw characters
  20 FOR j=1 TO 36  READ n  LET
z(j)=n  NEXT j  REM store them i
n array z
  21 CLS  PRINT AT 0,0, FLASH 1
,"morse keyboard ready"
  22 LET a$=INKEY$  IF a$="" THE
N GO TO 22  REM get a key press
  23 IF a$=" " THEN PRINT " ";
GO TO 22
  24 LET p=CODE a$-96  IF p>=-48
 AND p<=-39 THEN LET p=p+75  GO
TO 26  IF p<1 OR p>122 THEN GO T
O 22  REM only valid keys 0-9,a-
z
  26 PRINT a$,  LET n=z(p)  REM
find data
  29 LET x=n-INT (n/2)*2  REM bi
nary division
  35 BEEP .10+.20*(x=1),0  REM x
=1 is dash,beep .3.Dot=0 so beep
 .1
  50 LET n=INT (n/2)  REM more d
ivision
  70 GO TO 29-7*(n<=1)  REM get
another key if n<2
```

Peek & poke

Peek your problems to our address. Ian Beardamore will poke back an answer.

TO REVERSE

John Grain of Mill Street Witney, Oxford, writes

Q Could you please tell me if there is any way of using a statement to reverse a number just input into the computer (ZX Spectrum), for example to change 1472 to 2714?

I am writing a business program and need this operation to help me with an index code that I am developing. I hope you can help

A This has already been done. This neat solution was developed by Jeremy Ruston

```
10 INPUT A$
20 LET B$ =
30 FOR T = 1 TO LEN(A$)
40 LET B$ = A$ (T) + B$
50 NEXT T
60 PRINT B$
```

TRANSMITTER LINK-UPS

Sean Connelly of Valley Road, Macclesfield, Cheshire, writes

Q I will soon be getting a ZX Spectrum. As a great radio enthusiast, I would like to connect my two channel radio transmitter to my computer. Could you suggest an input/output port to do the job? Would a digital/analogue converter be suitable? I would be able to do any such modification myself if necessary.

A The direct answer is that I do not know how to connect a Spectrum to a two way transmitter. If you have access to a copy of our July 1 edition you will see it featured a whole page about SARUG UK, the Sinclair Amateur Radio Users Group in the United Kingdom.

To link a ZX81 to a transmitter, the group reckons that you need a 356 byte program and a I/O port with a single chip interface. For further information contact Paul Newman, (G4INP) 3 Red House Lane Leiston, Suffolk.

If you find that you still need help, try Stephen Adam's book *20 Simple Electronic Projects For the ZX81 and other Computers*. One of the programs in there is an A/D converter. The book is available from Interface 44-46 Earls Court Road London W8 6EJ

SHARP'S THE WORD

David Hale of Mushoku Avenue, Bents Green, Sheffield, writes

Q I am looking for a hand held computer that can be used to assist me in my model car racing. It's task would be to take lap times to 1/100th of a second — times taken by hand operated press button — then to time a second car in the same way. The information would be used to immediately calculate where the two cars should be in relation to each other in a given period of time or number of laps, given various speeds.

It would be useful if it could emit sounds instead of necessarily displaying the answer on a screen. I have considered the Sharp PC 1211, but it can only work to 1/10th of a second and it does not have sound.

Last November, Panasonic had a hand held computer at the NEC Birmingham, which could work to 1/50th of a second and had a range of eight octaves. The problem is that it is as yet only available in the US and I do not know if it will do the job. Should I try to import one? Alternatively, could you advise me of another hand held micro that would do the job?

A I have held this letter for a few weeks vainly waiting a reply from National Panasonic. The company over here know very little. The only information they have is a glossy sales leaflet that they promised to send me some weeks ago. It still has not arrived.

All I can add to what you already know is that it is due for launch over here sometime in mid-1983. I would not advise you to import one on such little knowledge.

As for an alternative, the only one that springs to mind is the new Sharp PC 1500. It is hand held and does have a tone generator on board. The company to contact, not only about the Sharp but about hand held micros in general, is Tempus, 38 Burleigh Street Cambridge CB1 1DG

EXORCIST'S SUCCESS

Miles Clarke of Worcester Road, Oxford, writes

Q I am trying to write a program on my Vic20 that will store information. I want to enter numbers and other facts on tape, for use at a later time. However, when I *Load* the tape and *Run* it, the information disappears, even if it was on the screen. How do I store information on a tape?

A The *Run* command clears all variables and starts the program again from scratch. You do not say how you input the information, but I presume that you are using something like *Input A$*. This can be overcome by using the *Goto* command.

You do not give details of the size of your program, nor how many variables you use for other things. All I can do is give a small sub-routine for storing information in a single string, which can be added to. *Run* the program initially, and thereafter *always* use *Goto* 30. This is true whether you want to add more information now, or at a later date after *Loading*. Of course, you can use *Run* if you want to clear the variable and start again

```
10 INPUT A$
20 PRINT A$
30 INPUT B$
40 A$ = A$+B$
50 PRINT A$
```

PROBLEMS OF TEMPERAMENT

Eric Smith of Lime Street Grangemouth, Stirlingshire, writes

Q I have a ZX81 and printer. I have noticed that the printer does not feed the paper very well and quite often stops altogether. This problem only occurred when I started using paper ordered from Sinclair. Is there any answer to this or am I stuck with having to pull the paper through while printing?

While on this subject do you know if it is possible for the Sinclair printer to be interfaced with the TI158 calculator? The cost of the Texas Instruments printer is prohibitive

A Problems seem to be cropping up with the ZX printer at the moment. Whether this is just a case of one bad batch, or an as yet undiagnosed design fault, I cannot say. I know that my printer has given me no problems whatsoever, though I have had to deal with a temperamental one here in the office.

First, check that the printer is clean and set up correctly. This may sound obvious but dirt does build up and if it clogs the rubber roller it will stop the paper moving.

Another alternative is to slightly tighten the two springs that hold the lower roller in place. Finally, you can slightly widen the Vs in which the paper roll spindles are located, though I would not advise this unless all else has failed.

When pulling the paper through, do not pull it very hard. A firm even pressure is what is needed. If this does not work, then wiggle the paper from side to side. If the machine is not sparking this will often get it going, though I do not know why.

I do not know if the Sinclair can be interfaced directly to the TI158, but I would doubt it. Your best bet is to get in touch with Microtanic Software of 235 Friern Road, Dulwich, London. They make a 'Printerface' which allows the ZX printer to be used with several computers

●Stop agonising over that problem. Write to Ian Beardsmore, Peek & Poke, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

Classified

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Write to Professor F H George, Bureau of Information Science, Commerce House, High Street, Chalfont St. Giles, Bucks

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VIC HANGMAN, good graphics, entry checks sound effects music many other features £2.75. A. Lambert, 18 Cedar Road Marple Cheshire

A1 SOFTWARE presents a multigame cassette for the Sinclair ZX Spectrum. Blitz Dropout Breakout, Racer and a UDG generator all on one tape for £9.95 or separately for £3.95. For details send a stamped addressed envelope to Mouse Hall Boiney Sussex RH17 5 RY

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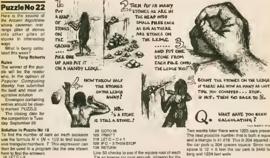
Competitions

Puzzle No 22

Here is the second of the Ancient Algorithms where cavemen rearrange piles of stones into other piles of stones in interesting ways

What is being calculated this week?

Tony Roberts



Rules

The winner of the puzzle will be the reader who, in the opinion of *Popular Computing Weekly* has submitted the best and most imaginative solution

Envelopes containing entries should be clearly marked PUZZLE

The closing date for the competition is Tuesday September 28

Solution to Puzzle No 18

To find the number of cars on each occasion use the formula $N \times (N + 1)/2$ to find successive triangular numbers T This expression can then be used in a program like the one shown here to find the answers

```
10 LET C = 0
20 LET N = 2
30 LET T = N*(N + 1)/2
40 LET X = SQR T
50 IF ABS (X - INT (X + 1E - 8)) <0.000001 THEN
   GOSUB 100
60 LET N = N + 1
70 GOTO 30
100 PRINT T
110 LET C = C + 1
120 IF C = 3 THEN STOP
130 RETURN
```

Line 50 checks to see if the square root of each T is an integer (or near enough allowing for the accuracy of the square-root function) If the T value is a square it is printed out and the program will stop after three such numbers, when $C = 3$

On the first day there were 36 cars in the park

Two weeks later there were 1225 cars present. The next possible number that is both a square and a triangle is 41,616 This is 204 squared so the car park is 204 spaces square Since each space is 12 × 6 feet the car park is 2448 feet long and 1224 feet wide

Winner of Puzzle No 18

The winner is P Ranklior, Rue Sauvage St Sampsons, Guernsey Channel Islands who receives £10 He adds The last answer is more cars than in the whole of Guernsey!

ARTHUR KEEPS FIT

A.R.T.H.U.R.

Laurence Lerner & James Macdonald

IF YOU SAY THIS	IF YOU SAY THAT	IF WHITE MAN FRIEND	IF WHITE MAN EN
IF SAY THIS IS	IF SAY THIS WAS	IF MAN FRIEND DOG	IF MAN FRIEND MACH
IF THIS IS ON	IF THIS IS OFF	IF FRIEND MACH DIG	IF FRIEND MACH AN
IF IS ON WHITE	IF IS ON BLACK	IF MACH DIG ARTH	IF AN DIG AL
IF ON WHITE MAN	IF ON WHITE WOM	IF DIG IT AL	IF AN AL DOG



Sinclair ZX Spectr

16K or 48K RAM... full-size moving-key keyboard... colour and sound... high-resolution graphics...

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You may decide to begin with the 16K version If so, you can still return it later for an upgrade The cost? Around £60



Raady to use today, easy to expand tomorrow

Your ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white)

Employing Sinclair BASIC (now used in over 500 000 computers worldwide) the ZX Spectrum comes complete with two manuals which together represent a detailed course in BASIC programming Whether you re a beginner or a competent programmer you ll find them both of immense help Depending on your computer experience you ll quickly be moving into the colourful world of ZX Spectrum professional-level computing

There s no need to stop there The ZX Printer – available now – is fully compatible with the ZX Spectrum And later this year there will be Microdrives for massive amounts of extra on-line storage plus an RS232 / network interface board



Key features of the Sinclair ZX Spectrum

- Full colour – 8 colours each for foreground background and border plus flashing and brightness intensity control
- Sound – BEEP command with variable pitch and duration
- Massive RAM – 16K or 48K
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- Sinclair 16K extended BASIC – incorporating unique 'one-touch' keyword entry syntax check, and report codes

rum

The ZX Printer – available now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set – including lower case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.

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The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing.

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The transfer rate is 16K bytes per second, with average access time of 3.5 seconds. And you'll be able to connect up to 8 ZX Microdrives to your ZX Spectrum.

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A remarkable breakthrough at a remarkable price. The Microdrives are available later this year, for around £50.





RS232/network interface board

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- Revolutionary microcomputer language FORTH
- Full size moving key keyboard
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- Fast cassette interface
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The Ace is set apart from all other personal computers on the market by its use of a revolutionary language called FORTH Some computer languages are easy for humans to understand others are easy for computers FORTH is most unusual in being both. Its underlying principles are so simple that it takes even a newcomer to computers only a few minutes to learn how to do calculations on the Ace yet the very same principles are powerful enough to allow you to invent your own extensions to the language itself

At the same time the memory-saving coded form used to store your programs inside the Ace allows it to obey them very fast — typically in less than a tenth of the time it would take to do the same thing using a different language Amongst other things this makes the Ace ideal for games

FORTH s unique combination of speed versatility and ease of programming has already made it a prime choice for professional applications as diverse as pub games and radio telescopes and gained it an enthusiastic national user group Now the Jupiter Ace can bring this addictive language into your own home.

Designed by Jupiter Cantab

Leading computer Designers Richard Altwasser and Steven Vickers have a reputation for pushing technology forwards. After playing the major role in creating the ZX Spectrum they formed Jupiter Cantab to develop their latest brainchild the Jupiter Ace.

Technical Specification

Hardware

Processor/Memory
Z80A running at 3.25 MHz. 8K bytes ROM 3K bytes RAM

Input
40 moving key keyboard with auto-repeat on every key

Output
Memory-mapped 32 x 24 character display with high resolution user graphics. Output to drive normal UHF TV set on channel 36

Sound
Provided by internal loudspeaker

Cassette
Load Save & Verify at 1500 baud separate data storage

Software FORTH

Data Structures
Integer Floating point and String data may be held as constants variables or arrays with multiple dimensions and mixed data types.

Control Stuctures
IF THEN ELSE DO LOOP BEGIN WHILE REPEAT BEGIN UNTIL, all may be mixed and nested to any depth

Operators
Mathematical + — X ÷
Logical AND OR NOT XOR
Comparison < > =

Program Editing
FORTH words may be listed edited and redefined Comments are preserved when words are compiled

Order Form

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